

CLAIMS

1. A thermal imaging system for quantitative thermal mapping of a scene, the system comprising:
 - 5 a thermal imaging device;
 - a first heat source of known temperature and emissivity, located within the scene viewed by the thermal imaging device; and
 - 10 a processor adapted to generate a calibrated temperature map of the scene from the data supplied by the thermal imaging device, based on the known temperature of the heat source.
- 15 2. A thermal imaging system according to claim 1 which further comprises a second heat source of known temperature and emissivity, located within the scene viewed by the thermal imaging device and wherein the processor is adapted to generate the calibrated temperature map from the data supplied by the thermal imaging device, based on the known temperatures of both the first and the second heat sources.
- 20 3. A thermal imaging system according to claim 1 or claim 2 which further comprises means for measuring the temperature of the or each heat source and communicating the temperature to the processor.
- 25 4. A thermal imaging system according to claim 3 wherein the temperature of the or each heat source is measured by a contact sensor.
- 30 5. A thermal imaging system according to claim 3 wherein the temperature of the or each heat source is measured by an infrared thermometer.
- 35 6. A thermal imaging system according to any of the preceding claims wherein the temperature of the or each heat source is adjustable by electronic means.
- 40 7. A thermal imaging system according to claim 6 wherein the temperature of the or each heat source is adjustable by resistance heating means.

8. A thermal imaging system according to claim 6 wherein the temperature of the or each heat source is adjustable by a device operating on the Peltier principle.
- 5 9. A thermal imaging system according to any of the preceding claims wherein the control of each heat source is effected by electronic circuitry local to that heat source.
- 10 10. A thermal imaging system according to claim 9 wherein a set-point temperature for control of the or each heat source is communicated from the processor to the electronic circuitry local to that heat source.
- 15 11. A thermal imaging system according to any of the preceding claims wherein a temperature range of the thermal imaging device is adjustable by the processor.
- 20 12. A thermal imaging system according to claim 11 wherein the temperature range is adjustable by the processor in accordance with the known temperature of the or each heat source.
- 25 13. A thermal imaging system according to any of the preceding claims wherein the thermal imaging device comprises a focal plane array (FPA) detector.
- 30 14. A thermal imaging system according to claim 13 wherein the FPA detector is an un-cooled FPA detector.
- 35 15. A thermal imaging system according to claim 14 wherein the thermal detectors are bolometers.
16. A thermal imaging system according to any of claims 13 to 15 which further comprises means for maintaining the temperature of the FPA detector at close to room temperature.
- 40 17. A thermal imaging system according to claim 16 wherein the temperature of the FPA detector is maintained by means of a device operating on the Peltier principle.

18. A thermal imaging system according to any of the preceding claims wherein the FPA detector is cased in a protective housing.
- 5 19. A thermal imaging system according to any of the preceding claims where in the or each heat source has a surface finish substantially identical to that of an object of primary interest in the scene.
- 10 20. A thermal imaging system according to any of the preceding claims wherein the or each heat source comprises at least a portion of an object forming part of the scene to be thermally mapped.
- 15 21. A thermal imaging system according to claim 20 wherein the temperature of the object is monitored using at least a contact thermometer fitted to the object.
- 20 22. A thermal imaging system according to any of claims 1 to 18 wherein the or each heat source is a black body source.
- 25 23. A thermal imaging system according to any of the preceding claims, wherein the system is adapted to identify temperature variations in at least part of a target object within the scene, the target object being a living subject.
- 30 24. A thermal imaging system according to claim 23, wherein the living subject is a human.
25. A thermal imaging system according to claim 24, wherein the part of the target object is a hand, foot or face.
- 35 26. A method of generating a quantitative thermal map of a scene, the method comprising:
positioning a first heat source of known temperature and emissivity within the scene;
imaging the scene using a thermal imaging device; and
40 generating a calibrated temperature map of the scene, based on the known temperature of the heat source.

27. A method according to claim 26 further comprising positioning a second heat source of known temperature and emissivity within the scene and generating the calibrated temperature map of the scene based on the known temperatures of both heat sources.

28. A method of generating a quantitative thermal map of a scene, the method comprising:

10 selecting at least part of an object in the scene, of known emissivity;

measuring the temperature of the at least part of an object, the at least part of an object acting as a first heat source;

15 imaging the scene using a thermal imaging device; and generating a calibrated temperature map of the scene, based on the measured temperature of the heat source.

29. A method according to claim 28 further comprising selecting a second at least part of an object in the scene 20 of known emissivity, measuring its temperature such that it acts as a second heat source, and generating the calibrated temperature map of the scene based on the known temperatures of both heat sources.

25 30. A method according to any one of claims 26 to 29, which further comprises monitoring the temperature of the or each heat source and communicating the temperature(s) to a processor.

30 31. A method according to any of claims 26 to 27 or 28 to 29 and 30, further comprising identifying temperature variations in at least part of a target object within the scene, the target object being a living subject.

35 32. A method according to claim 31, wherein the living subject is a human.

33. A method according to claim 32, wherein the part of the target object is a hand, foot or face.

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34. A method according to any of claims 31 to 33, wherein

the method further comprises issuing a signal if the measured temperature of the subject is in excess of a threshold.

5 35. A method according to claim 34, wherein the method is repeated for a number of different living subjects so as to distinguish those with an elevated body temperature with respect to those exhibiting a normal body temperature.

10 36. A method according to any of claims 26 to 27 or 28 to 29 and 30 to 35 which further comprises communicating a set-point temperature to the or each heat source, and thereby controlling the temperature of the or each heat source.

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37. A method according to any of claims 26 to 27 or 28 to 29 and 30 to 36 which further comprises controlling a temperature range of the thermal imaging device, in accordance with the temperature of the or each heat source.